Language

How to connect CubeCell to TTN(The-Things-Network)

CONTENT

Overview

CubeCell Series is an efficient, low-cost LoRa node solution device by the Heltec AutoMation development team.

CubeCell has lower power consumption than ESP32 (sleep current 3.5uA), better impedance matching design, better RF power (core integration SX126x), and reserved solar panel interface to support 5.5V to 7V solar panels .

The CubeCell series of devices can be developed through the exclusive underlying layer developed by the HelTec team to perfectly support the convenient Arduino IDE.

The installation environment can be automatically installed by one-click download of the Arduino IDE How to install and develop the CubeCell Arduino development environment

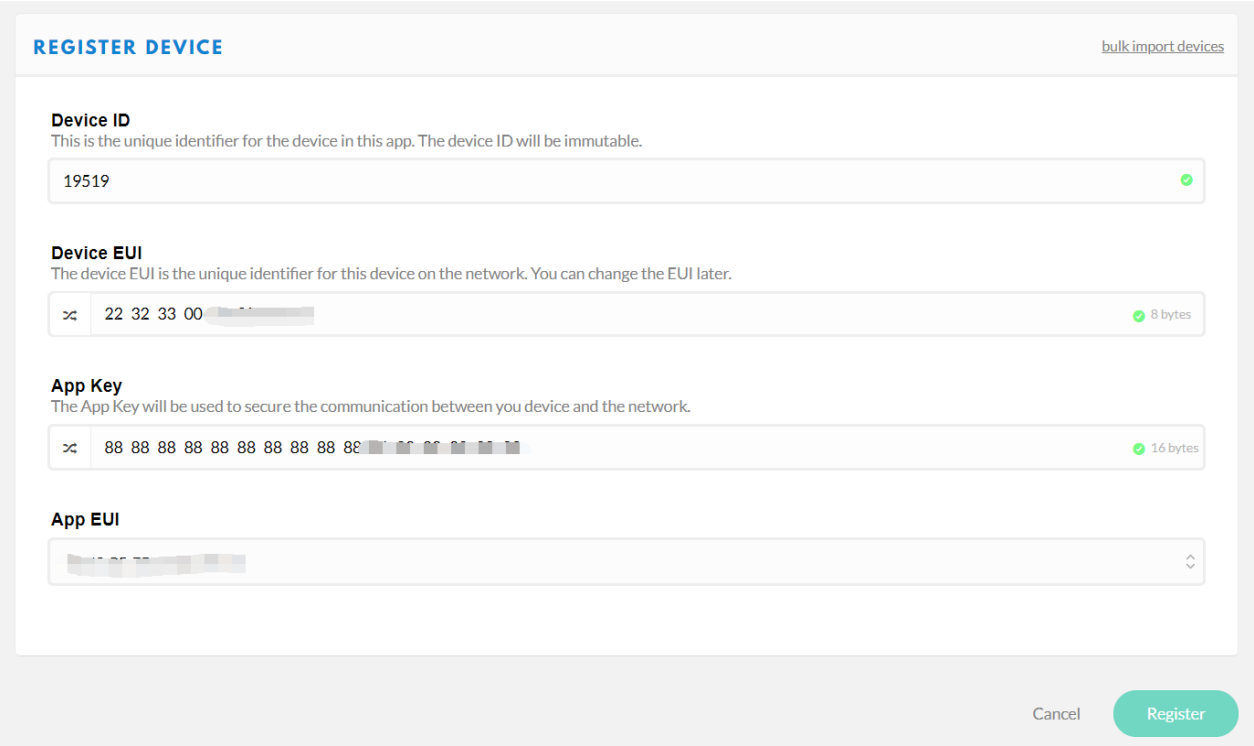
This article aims to describe how to connect the CubeCell Series (CubeCell-Board) to the TTN via the OTAA method in the LoRaWAN example.

Preparation

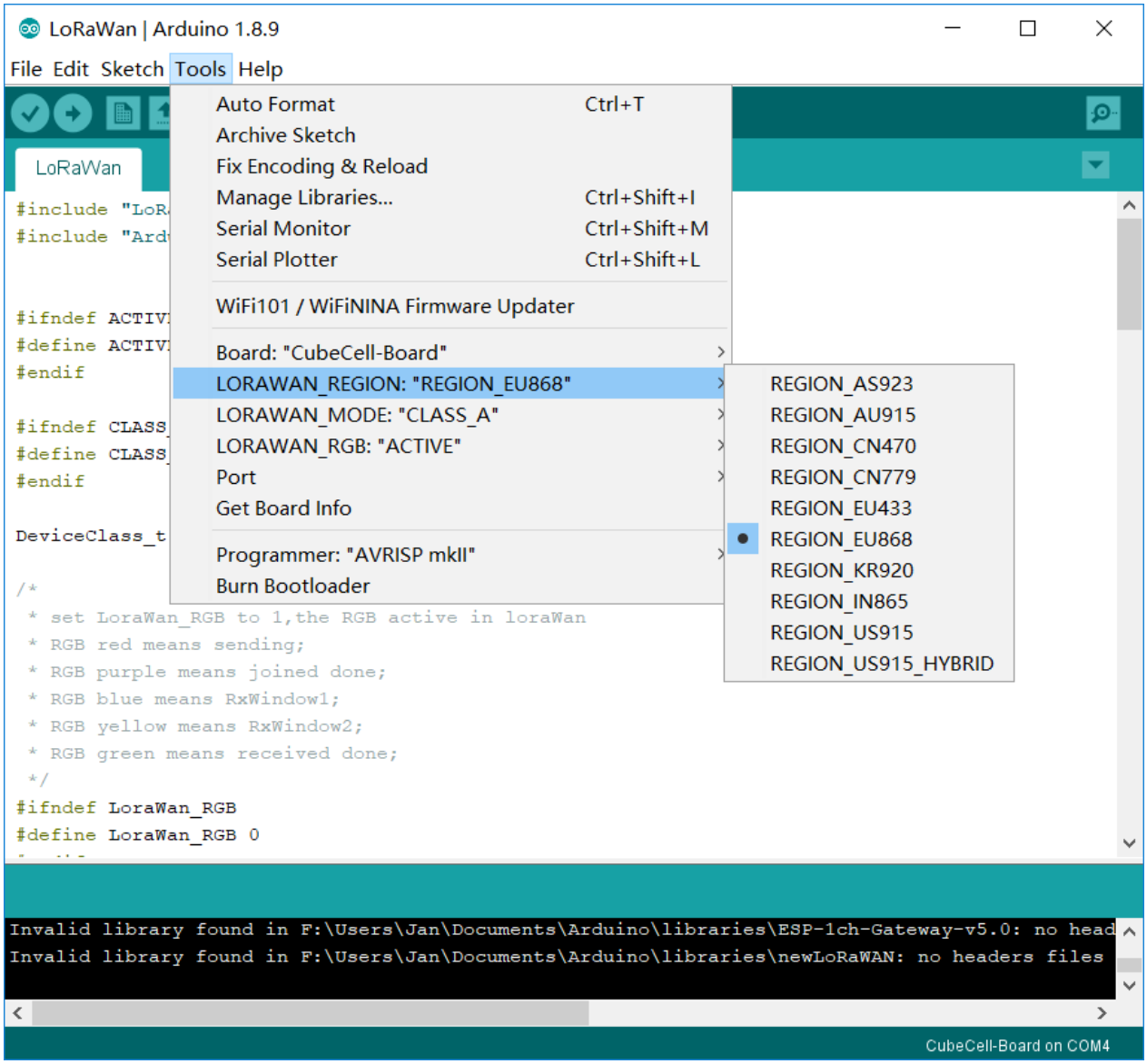
- Arduino IDE.
- First we need a gateway to connect to the TTN (for example, HT-M01), how to connect the gateway (HT-M01, HT-M02) to the TTN, please refer to here.
- A CubeCell-Board or CubeCell-Cupsule and a premium USB cable.
- In this example, I use HT-M01 Gateway and drive it through Windows ® via USB, and use CubeCell-Board to quickly connect to TTN.

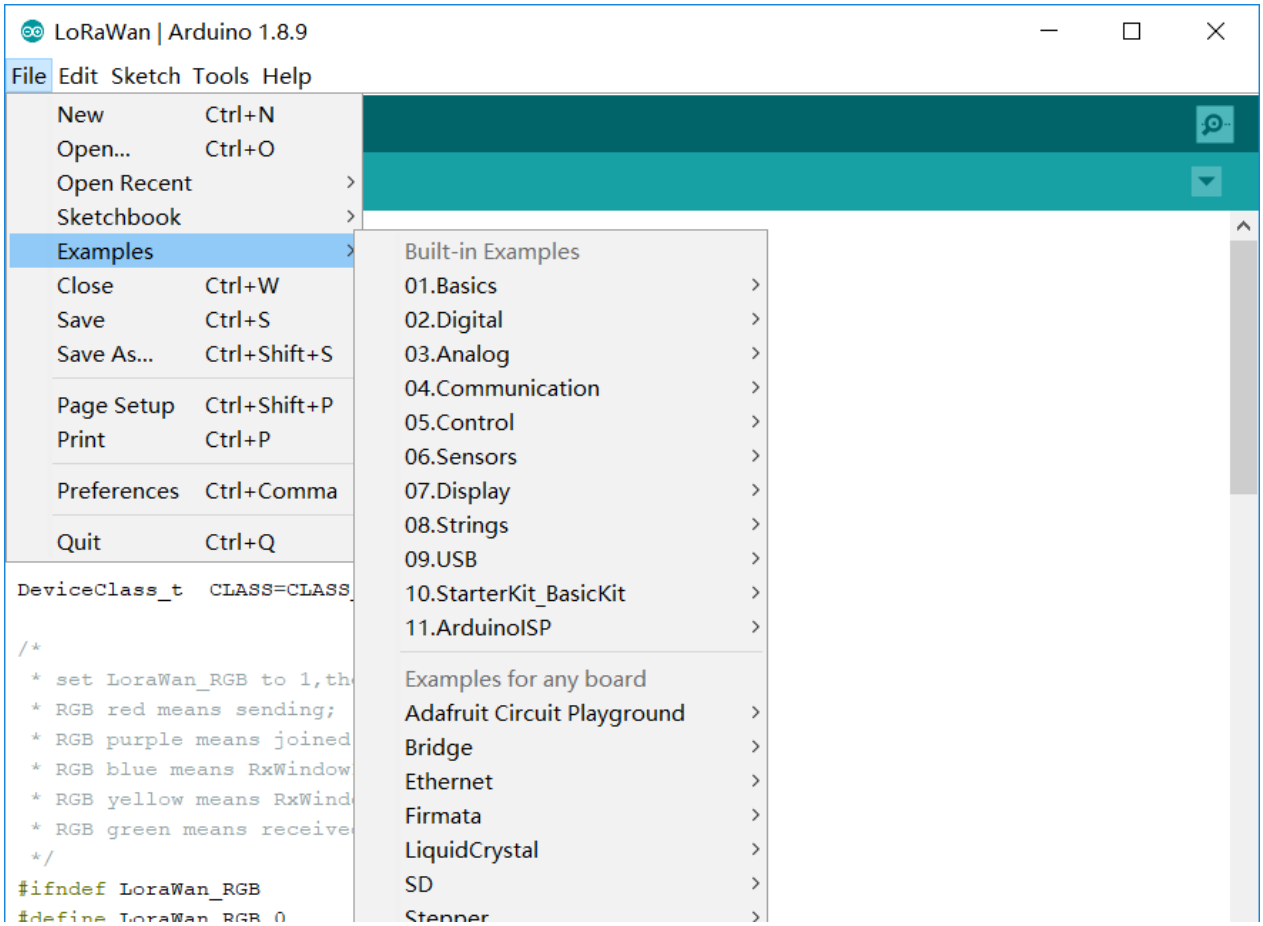
Configure node information

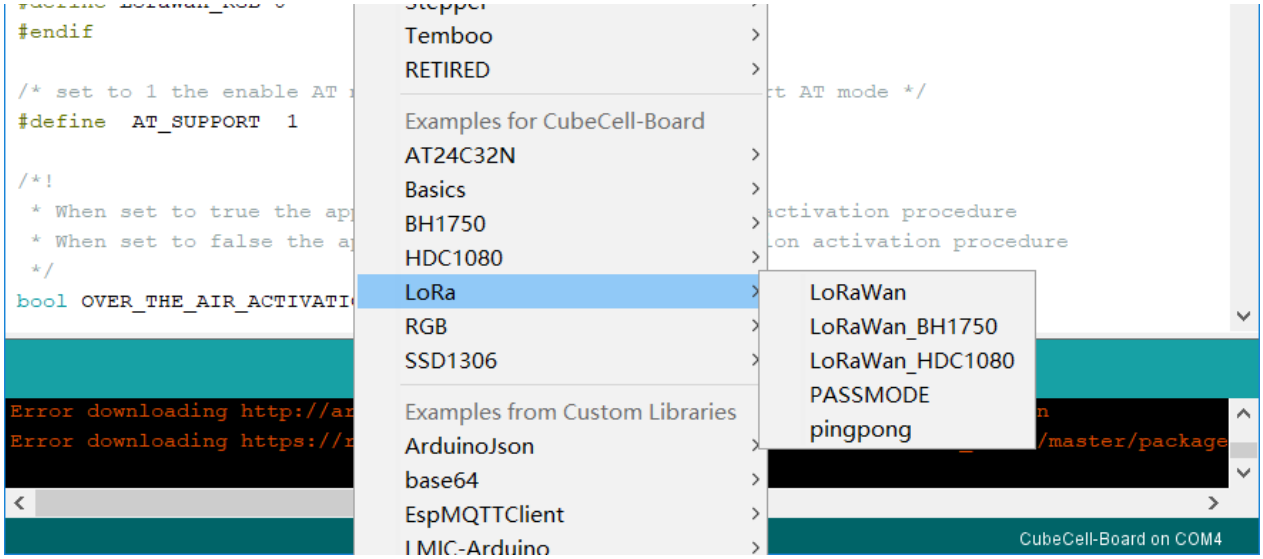
First we have to create a new CubeCell-Board node in the TTN.



- After installing the CubeCell Arduino IDE development environment, select CubeCell-Board in the Arduino, and the working frequency band, and select LoRaWAN example.
- I need the CubeCell-Board to work in the EU 868 band in Class A mode, which requires:


LoRaWan | Arduino 1.8.9
File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
WiFi101 / WiFiNINA Firmware Updater
Board: "CubeCell-Board"
LORAWAN_REGION: "REGION_EU868"
LORAWAN_MODE: "CLASS_A"
LORAWAN_RGB: "ACTIVE"
Port
Get Board Info
Programmer: "AVRISP mkII"
Burn Bootloader
REGION_AS923
REGION_AU915
REGION_CN470
REGION_CN779
REGION_EU433
REGION_EU868
REGION_KR920
REGION_IN865
REGION_US915
REGION_US915_HYBRID
LoRaWan
#include "LoR
#include "Ard
#ifndef ACTIV
#define ACTIV
#endif
#ifndef CLASS
#define CLASS
#endif
DeviceClass_t
/*
* set LoraWan_RGB to 1,the RGB active in loraWan
* RGB red means sending;
* RGB purple means joined done;
* RGB blue means RxWindow1;
* RGB yellow means RxWindow2;
* RGB green means received done;
*/
#ifndef LoraWan_RGB
#define LoraWan_RGB 0
Invalid library found in F:\Users\Jan\Documents\Arduino\libraries\ESP-1ch-Gateway-v5.0: no head
Invalid library found in F:\Users\Jan\Documents\Arduino\libraries\newLoRaWAN: no headers files
CubeCell-Board on COM4


LoRaWan | Arduino 1.8.9
File Edit Sketch Tools Help
New Ctrl+N
Open... Ctrl+O
Open Recent
Sketchbook
Examples
Close Ctrl+W
Save Ctrl+S
Save As... Ctrl+Shift+S
Page Setup Ctrl+Shift+P
Print Ctrl+P
Preferences Ctrl+Comma
Quit Ctrl+Q
Built-in Examples
01.Basics
02.Digital
03.Analog
04.Communication
05.Control
06.Sensors
07.Display
08.Strings
09.USB
10.StarterKit_BasicKit
11.ArduinoISP
Examples for any board
Adafruit Circuit Playground
Bridge
Ethernet
Firmata
LiquidCrystal
SD
Stepper
DeviceClass_t CLASS=CLASS
/*
* set LoraWan_RGB to 1,th
* RGB red means sending;
* RGB purple means joined
* RGB blue means RxWindow
* RGB yellow means RxWind
* RGB green means receive
*/
#ifndef LoraWan_RGB



- 1. Make sure the AT command mode is turned on and the required features are turned on.

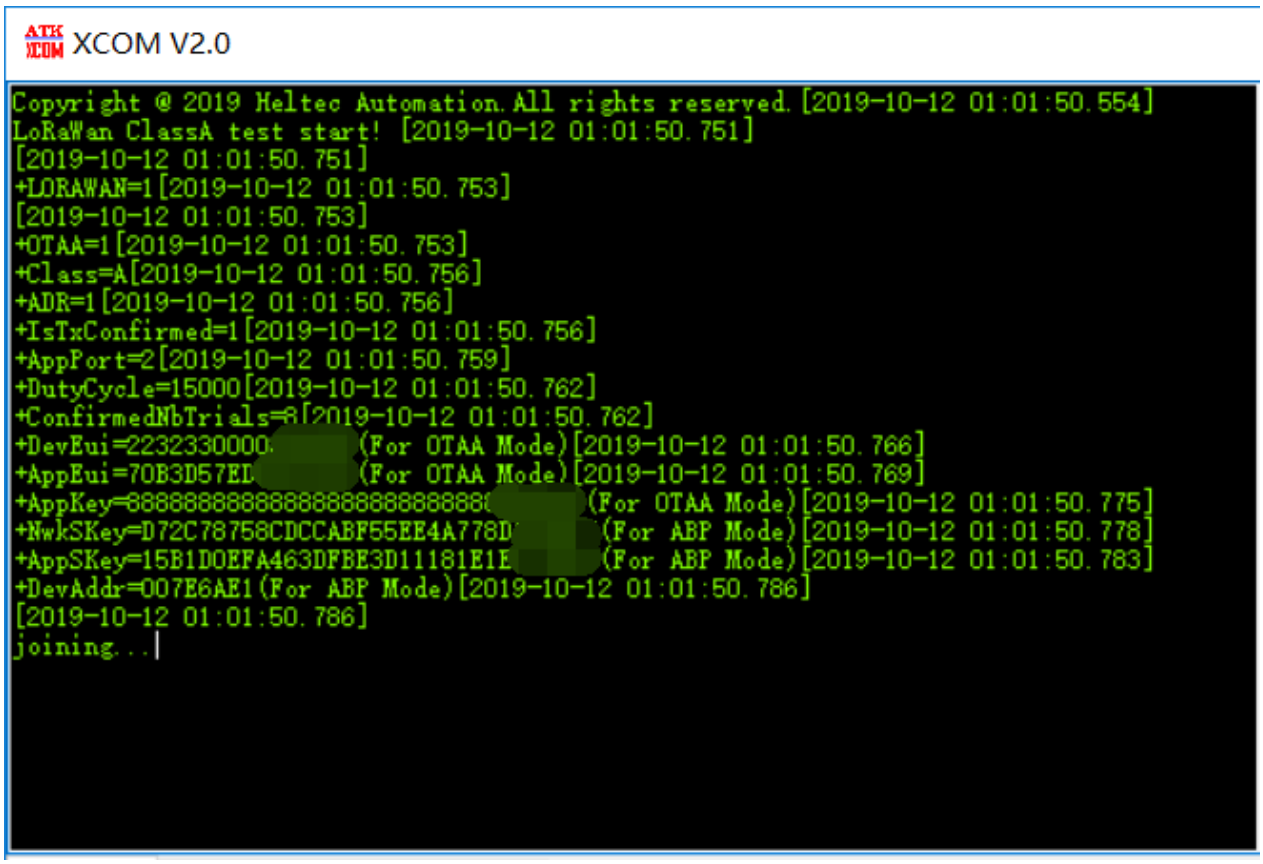
  ```
  #define  AT_SUPPORT  1
  ```

  For example, turn on the RGB light.

  ```
  #define LoraWan_RGB 1
  ```

- 2. Click to download.
- 3. The node access information is configured through the AT command.

Open the serial port (COM4) and reset the CubeCell-Board. After the node is started, you can observe the printing:



At the beginning we need to send arbitrary data to the COM to wake up the MCU.

We will see the information returned by CubeCell-Board.

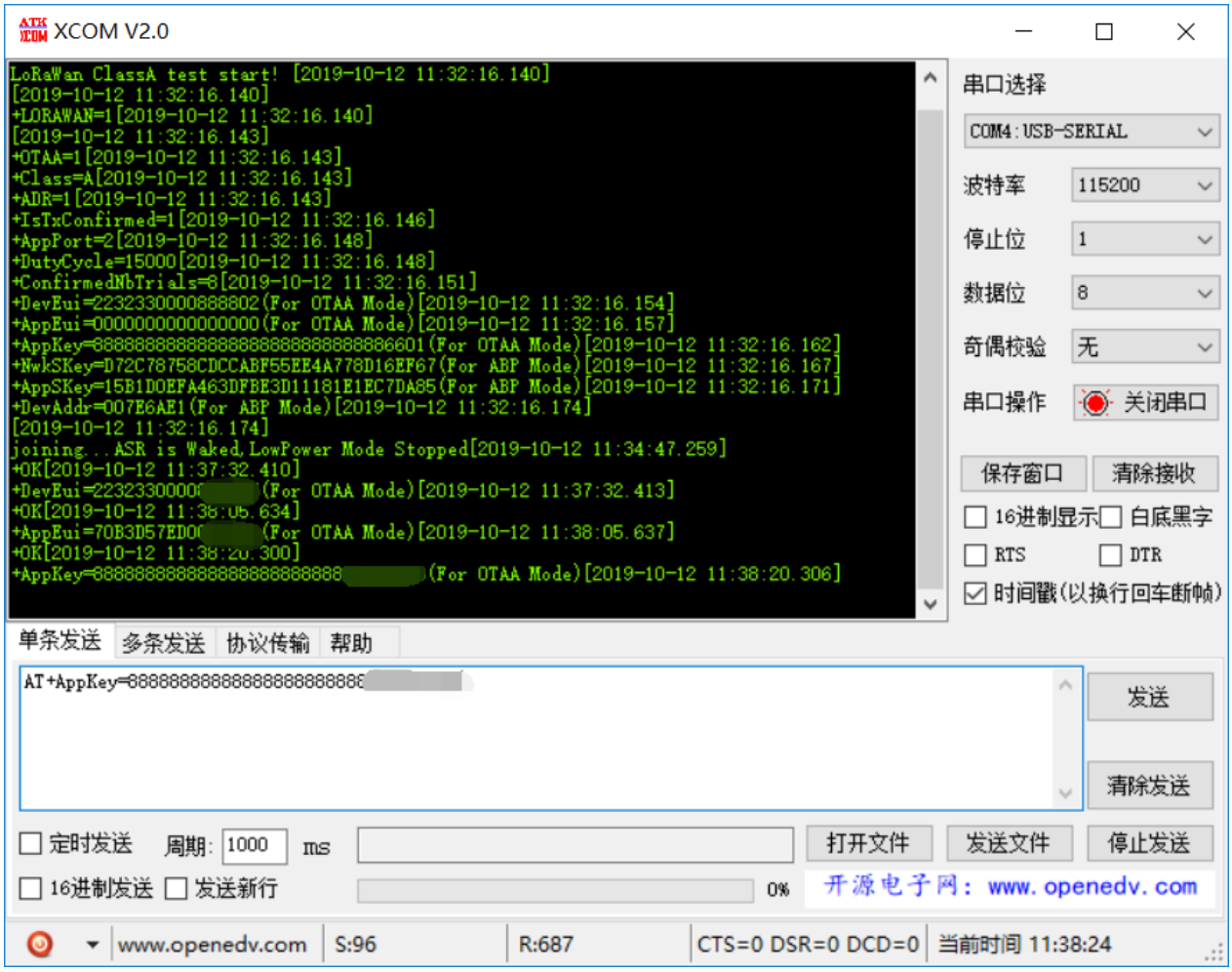
```
ASR is Waked,LowPower Mode Stopped
```

After waking up the MCU, we can start to configure the DevEui, AppEui, AppKey of the registered nodes to CubeCell-Board.

E.g:

```
AT+DevEui=2232330000******
AT+AppKey=88888888888888888888888********
AT+AppEui=70B3D57ED00*****
```

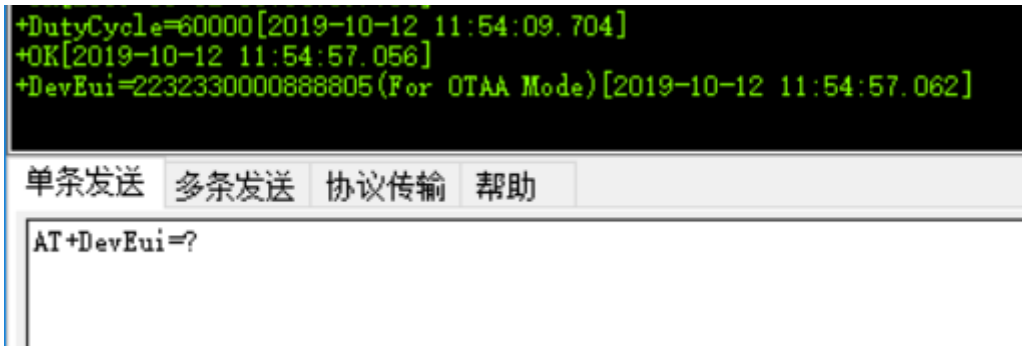
PS: '*' is the actual registered number. We need to be careful to ensure that the interval between each instruction is >100ms as much as possible to avoid some unnecessary bugs.



The node works in Class A mode by default, and the sending period is 15s. By default, ADR is enabled.

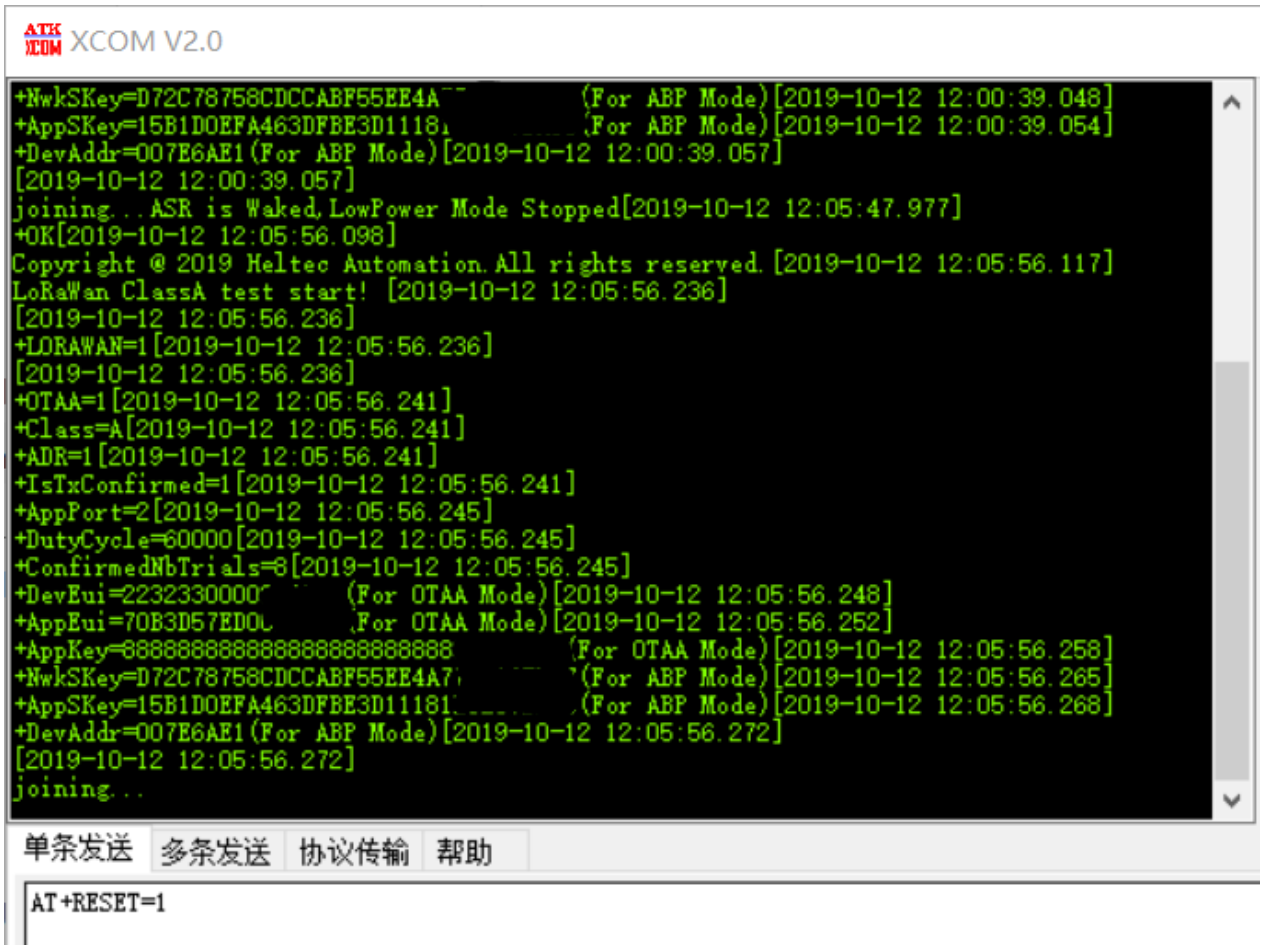
For example, I need to modify the send period to 60s and query the EUI of the node:

```
AT+DutyCycle=60000
AT+DevEui=?
```



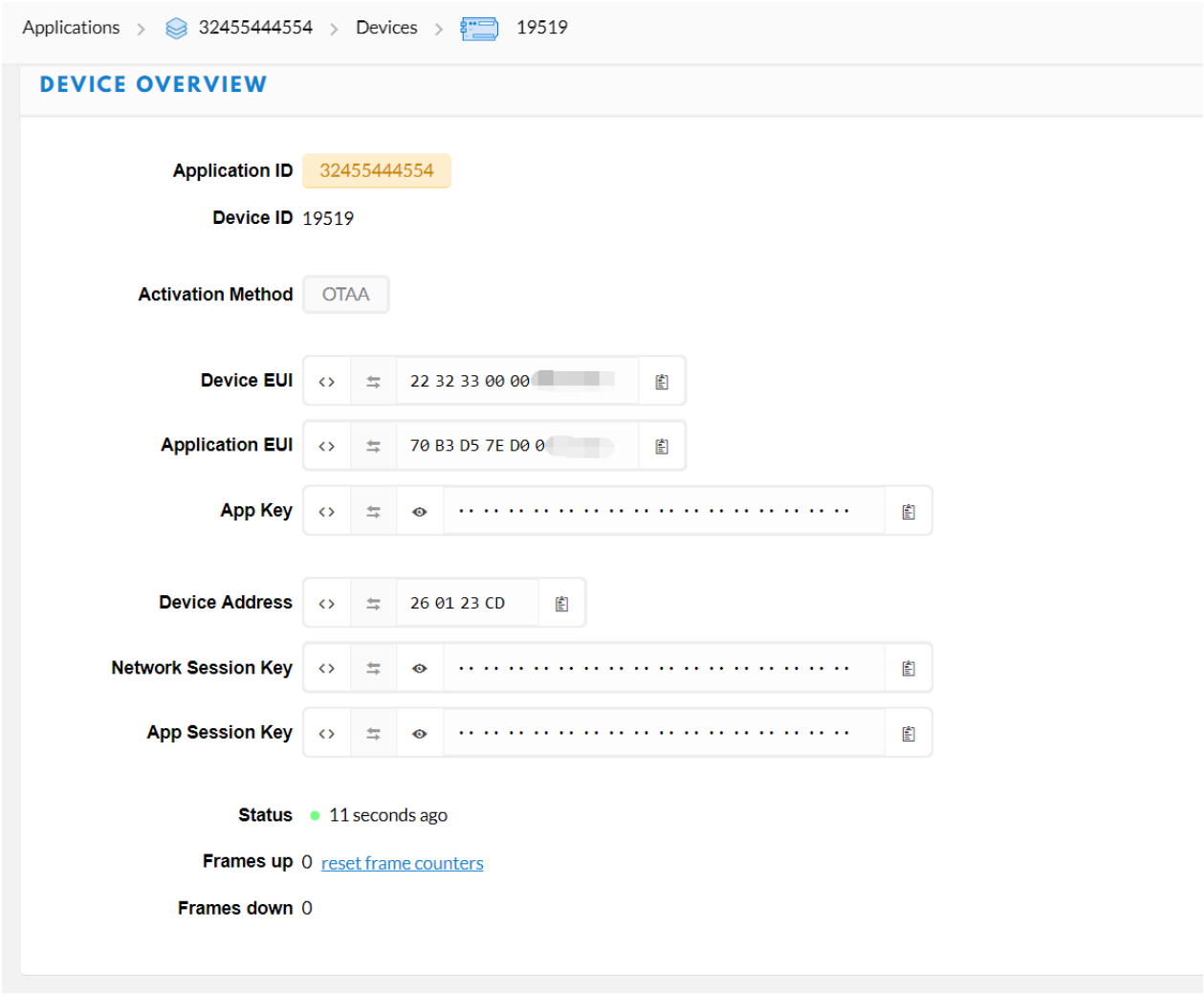
Please note that the configuration of the node's network access information must take effect only when the node is reset or the next time it enters the network. The parameters that have been configured by the node are printed after reset.

The CubeCell-Board can be reset by sending `AT+RESET=1` .



The CubeCell-Board completes the reset and starts to enter the network.

Return to TTN to view:



CubeCell-Board has successfully connected to TTN!

Enjoy!